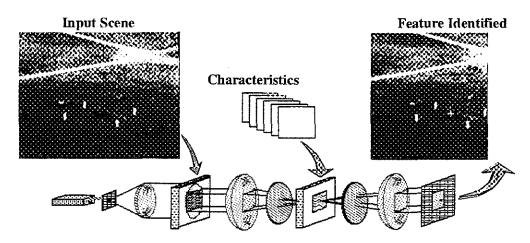
AN INNOVATIVE TECHNOLOGY FOR MARS EXPLORATION

E. Michael Henry Lockheed Martin Corporation



The human mission to Mars will require innovative technology advances in autonomous control, hazardous avoidance, habitats, environmental protection, and in situ resource utilization.

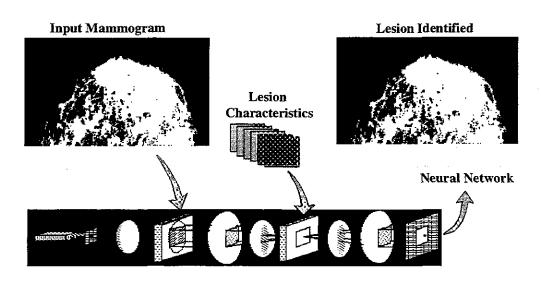
OPTICAL PATTERN RECOGNITION



- •Inherently Massively Parallel (Entire Frame Simultaneously)
- •Excellent Discrimination, Low False Alarm Rates
- •Low Power, Light Weight, Small Volume

A technology that can perform ultrahigh throughput pattern recognition uses a laser and lenses in a Fourier-transform-based algorithm. It has been shown in DoD applications to have exceptional detection probability and features location accuracy, coupled with the low power/weight/volume essential for a planetary mission.

AUTOMATIC LESION DETECTION



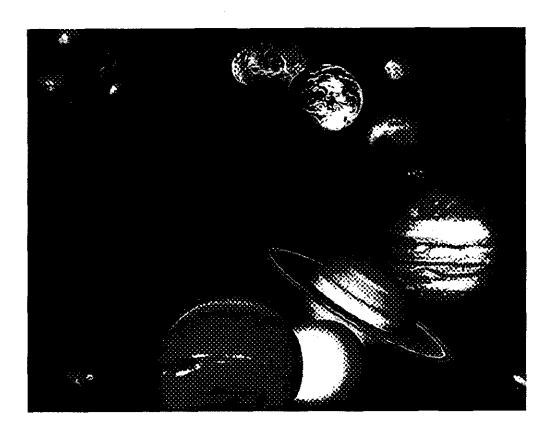
Besides DoD target recognition, the optical processor has been shown to have outstanding capability to detect even tiny cancers in medical imagery.

Processing

Application Concepts

Landmark Star Tracking Recognition & Guidance Correction Optical Navigation Hazard Avoidance Rendezvoù Docking Scientific Data Processing & Compression

Depicted here are the multiple functions that could be performed by the same optical processor on a planetary mission. This multifunctional capability, along with its exceptional efficiency, makes the optical processor a prime candidate to assist in the human mission to Mars.



Out here there are no stop signs Lockheed Martin believes that no goal in planetary exploration is unachievable.